State Universities and Land-Grant Colleges, or the American Council on Education, which have led the fight for the funding of public higher education at local, state and national levels.

Has the public university been unmade and Newfield's new middle class damaged? Hardly. Government funding has decreased in public universities, but they still have a critical role in US society. In the prestigious Association of American Universities, composed of the 60 leading research universities in the nation, more than half are public. The middle class is suffering some economic reversals, but the reasons are complex. Public higher education will continue to have a leading role in providing access to a good-quality education at an affordable price, for those who wish to improve their standard of living and quality of life. ■

John B. Clark is interim chancellor at the State University of New York, State University Plaza, Albany, New York 12246, USA.
e-mail: john.clark@suny.edu

Q&A: Science sketched out

The annual UK Big Draw festival, a month of nationwide workshops and talks launched this weekend in London, teaches people how to 'see' through drawing. **Terry Rosenberg**, head of design at Goldsmiths, University of London, explains how gaining skills in life drawing can help scientists perceive the world and communicate their results.

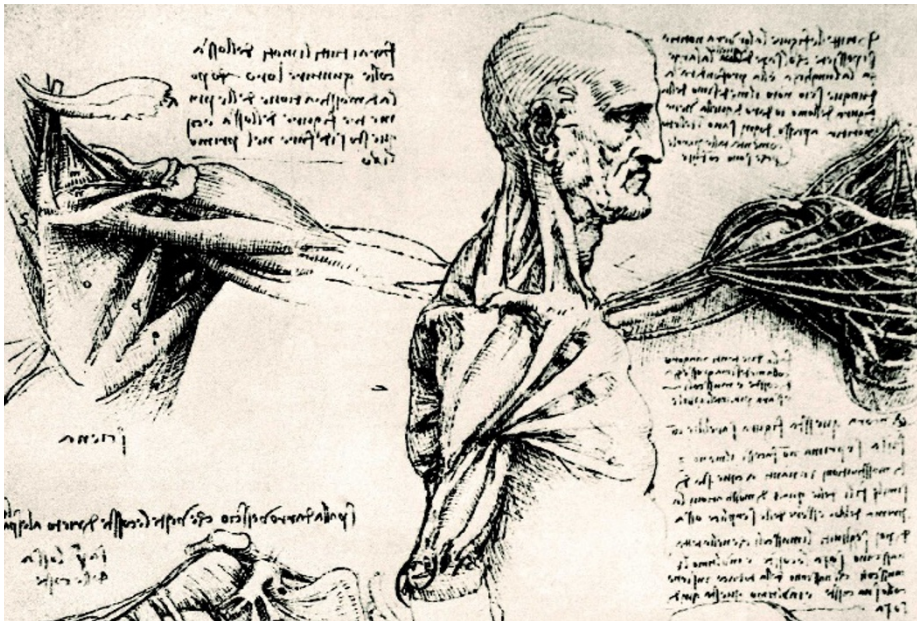
Drawing on Life
Wellcome Collection, London
26–28 September 2008
University College London
27 September 2008
www.thebigdraw.org

Why should scientists learn to draw?
Drawing can improve our understanding of perception by isolating different parts of the perceptual apparatus. When I first learned to draw, I would break up a scene into patches and try to reproduce each one. But this doesn't work — the eyes are constantly adjusting, the head moving, the light changing.

One teaching technique I use is to draw by moving the pencil in the same way that the eyes scan. This highlights the way the brain gathers information by making connections between different elements of the scene. Alberto Giacometti and other artists have done this more formally by plotting out such spatial relationships, into which a drawing can then be situated.

Leonardo Da Vinci studied anatomy using life drawing. Might students do so today?
Drawing moves from the general to the particular — looking at how the anatomy is articulated in practice; the positions, posture and movement of one bone over the other. I ask students to draw a posed skeleton, then draw a model in the same pose, building the muscles on top of the bones and resolving the tensions between them. You can then go back and infer what is inside the model.

Colouring and copying diagrams of the human body, as students do, is still drawing. They seem like strategies for rote learning, but when you look at an object and sketch it, you bring all your previous experience and knowledge to that moment.



BETTMANN/CORBIS

Life drawing is a useful learning method for anatomy students today — as it was for Leonardo da Vinci.

Can the act of drawing generate ideas?
Einstein claimed that his theories of relativity were merely hunches followed up by rigorous method. But how did he get the hunch? My design research looks at how laying out connections in time and space on the page can trigger new ideas. Rather than just seeking trends, our brains make nonlinear connections and homologies between juxtaposed objects, and original ideas result.

Might scientists use diagrams more effectively to communicate ideas?
Diagrams offer a quick way of making a hypothesis. Canonical representations such as hieroglyphs, where the symbol for a face might show it in profile, are often used. They communicate what is most important, but can ignore other elements of the underlying structure — the profile face hieroglyph misses out an eye, for example. And diagrams can also be driven too much by aesthetics: even anatomical diagrams use metaphors of the landscape, such as rivers, peaks and valleys. Scientists might learn from design research, which explores how information can be best conveyed spatially — as in the schematic map of the London Underground, for example.

Does drawing try to represent the 'truth'?
Subjective knowledge always intercedes in the processes that bind the hand to the eye. It has been said that drawing 'cleans things', but there is no ultimate image — every drawing tells you something different. ■

Interview by **Louise Whiteley**, a computational neuroscientist and writer based in London. She is deputy editor of *The Liberal* magazine.
e-mail: lewhiteley@gmail.com